Neap

Final Examination 2022

NSW Year 11 Biology

Solutions and Marking Guidelines

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SECTION I

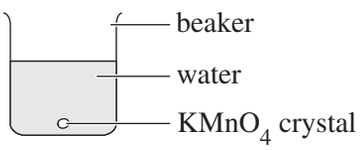
Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 1 **B** **B** is correct. Bacteria are prokaryotic cells as they have no membrane-bound organelles. **A** and **C** are incorrect. Viruses are DNA or RNA coated in protein and prions are proteins, so both options are non-cellular. **D** is incorrect. Fungus is a eukaryote as it is cellular and has a nucleus.	Mod 1 Cells as the Basis of Life BIO11–8 Band 2
Question 2 **D** **D** is correct. Using a monocular light microscope, the cell wall and nucleus can be identified. **A** is incorrect. The cells will not have chloroplasts as they are from an onion, which is a type of plant that grows under the ground (a tuber). **B** and **C** are incorrect. Mitochondria are organelles that are too small to be seen under a monocular light microscope at the magnification shown in the photograph.	Mod 1 Cells as the Basis of Life BIO11–3, 11–8 Band 3
Question 3 **C** **C** is correct. Label 1 refers to the cytoplasm, label 6 refers to a plasmid (a circular piece of DNA) and label 7 refers to a flagellum. **A**, **B** and **D** are incorrect. Plasma is the fluid component of blood, so it cannot be shown at label 1. Label 5, not label 6, refers to DNA or RNA. Pili (or fimbrae) are small, straight projections, whereas flagella are long, whiplike projections, which are shown in the diagram.	Mod 1 Cells as the Basis of Life BIO11–8 Band 3
Question 4 **D** **D** is correct. Active transport occurs when a substance moves across a concentration gradient to an area of higher concentration. This transport requires energy (ATP) and is usually assisted by enzymes. **A**, **B** and **C** are incorrect. Osmosis and diffusion are examples of passive transport, which requires no energy. Osmosis is a type of diffusion where water moves from an area of low solute concentration to an area of high solute concentration across a semi-permeable membrane. Diffusion occurs when substances move from an area of higher concentration to an area of lower concentration.	Mod 1 Cells as the Basis of Life BIO11–8 Band 4

Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 5 **B** **B** is correct. This option classifies all three adaptations correctly. Fennec foxes having large ears is a structural adaptation; urohydrosis is a behavioural adaptation, as it helps the stork to cool down; the camel's ability to tolerate high body temperatures without metabolic damage to enzymes and cells is a physiological adaptation. **A**, **C** and **D** are incorrect. Penguins huddling to keep warm is a behavioural adaptation, and cactus plants having limited stomate numbers is a structural adaptation.	Mod 3 Biological Diversity BIO11–10 Band 4
Question 6 **B** **B** is correct. Since the student is investigating the effect of light on photosynthesis, this is the correct hypothesis as it links the correct variables for the purpose of the study – the independent variable is light and the dependent variable is the presence of starch in the leaf, which indicates whether photosynthesis has occurred. **A** and **D** are incorrect. While either could be a valid investigation, the presence or absence of chlorophyll and the plant being green are not the independent variables in the student's investigation. **C** is incorrect. Plants will not photosynthesise while in a cupboard.	Mod 2 Organisation of Living Things BIO11–1, 11–9 Band 5
Question 7 **D** **D** is correct. This option lists the controlled variables. **A** and **C** are incorrect. These options include the amount of light to which each plant was exposed, which is the independent variable. **B** is incorrect. This option includes the cupboard a plant was placed in to see the effect of light versus no light on the plant, which is the control set-up.	Mod 2 Organisation of Living Things BIO11–2, 11–9 Band 5
Question 8 **B** **B** is correct. Reliability (reproducibility) means that similar results are obtained from many repetitions. **A** is incorrect. While using an average can contribute to reliability, it does not ensure it. **C** is incorrect. Accuracy refers to precision of measurement and how close experimental values are to published data. **D** is incorrect. Validity is obtained by choosing the correct independent, dependent and controlled variables to investigate the hypothesis.	Mod 2 Organisation of Living Things BIO11–3, 11–9 Band 4

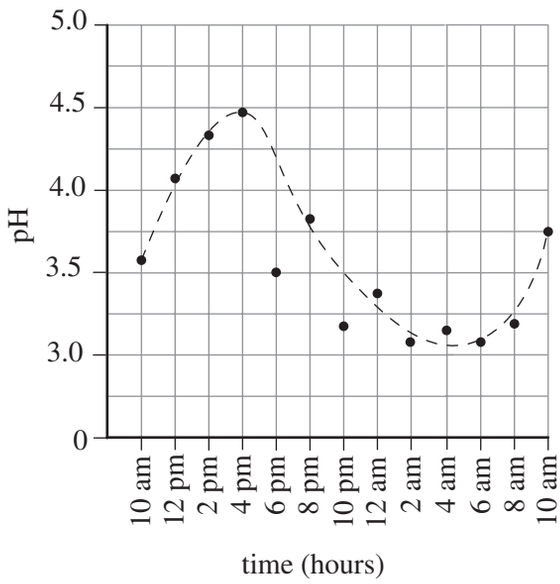
Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 9 **A** **A** is correct. The structure labelled *X* is a stomate. The function of the stomate is to allow passage of carbon dioxide into and water and oxygen out of the leaf. **B** and **C** are incorrect. Photosynthesis and respiration are metabolic reactions that occur within the cells. While these processes do occur in the guard cells, the function of the stomate is not specifically for these processes. **D** is incorrect. Osmosis is a process in which water diffuses from an area of low solute concentration to an area of high solute concentration, across a semi-permeable membrane into or out of cells. Water exits the leaf through the stomates in the process of transpiration, not osmosis.	Mod 2 Organisation of Living Things BIO11–3, 11–9 Band 3
Question 10 **C** **C** is correct. Antibiotic resistance evolves because random mutations in bacterial cells can cause some bacteria to be resistant to antibiotics. Those cells survive and reproduce, so the population becomes resistant. **A** is incorrect. While over-prescription of antibiotics contributes to antibiotic resistance, it does not make humans immune to antibiotics. **B** is incorrect. Antibiotics do not cause mutations in cells. This is a common Lamarckian misconception. **D** is incorrect. The use of antibiotics in the agricultural sector is cause for concern and does contribute to antibiotic resistance, but it is bacteria that become resistant, not animals.	Mod 3 Biological Diversity BIO11–10 Band 5
Question 11 **B** **B** is correct. The diameter of the ammonite can be worked out using the length of the lens cap, which is 6.5 cm. Therefore, the diameter in the horizontal direction of the ammonite is approximately 16 cm and the diameter in the vertical direction is approximately 23 cm. **A** is incorrect. These values are too small. **C** and **D** are incorrect. These options estimate that the diameter of the ammonite is greater than 33 cm, which is too large.	Mod 3 Biological Diversity BIO11–3, 11–10 Band 4

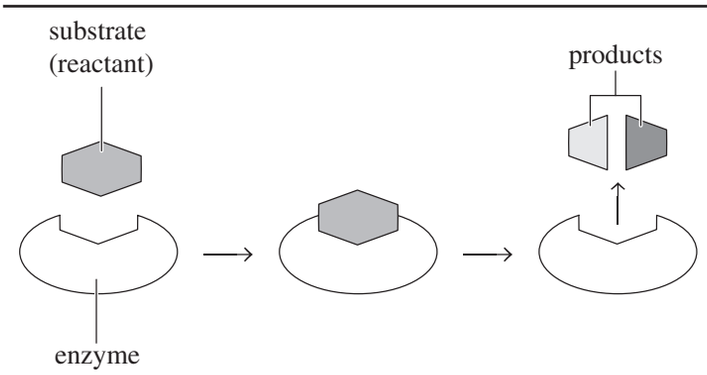
Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 12 D **D** is correct. Herbivorism describes an organism (the kudu) that feeds on plants. Mutualism is a relationship between two organisms where both benefit from the relationship. In the photograph, the oxpecker benefits by eating ticks (food) from the body of the kudu, and the kudu benefits by having the ticks (parasites) removed by the oxpecker. Parasitism is a symbiotic relationship where one organism benefits from the relationship (the tick) and the other organism is harmed (the kudu). The ticks are a parasitic arthropod that live on the kudu and suck nutrients from its body. **A**, **B** and **C** are incorrect. These options incorrectly classify the ecological relationships. Carnivorism describes an organism that eats mostly meat. Commensalism is a symbiotic relationship where one organism benefits from the relationship and the other is not harmed or benefitted. Predation involves one organism (predator) killing another organism (prey) for food.	Mod 4 Ecosystem Dynamics BIO11–11 Band 3
Question 13 C **C** is correct. Nitrogen is an element found in proteins. **A** is incorrect. Carbohydrates are made from carbon, oxygen and hydrogen. **B** is incorrect. Energy comes from carbohydrates, not nitrogen. **D** is incorrect. Other than being present in the enzymes that catalyse photosynthesis, nitrogen is not required for photosynthesis.	Mod 4 Ecosystem Dynamics BIO11–11 Band 2
Question 14 D **D** is correct. 10% of energy passes from one trophic level to the next trophic level up a food chain, so 90% of energy is lost at each trophic level, mainly through heat. **A**, **B** and **C** are incorrect. These options do not give the correct percentage.	Mod 4 Ecosystem Dynamics BIO11–11 Band 2
Question 15 B **B** is correct. Decomposers like bacteria and fungi recycle matter in ecosystems. **A** and **C** are incorrect. Energy is lost throughout the food web; it is not recycled in the ecosystem. **D** is incorrect. While decomposers break down dead and decaying animals and remove them from the ecosystem, they also break down plants and other organisms and, in doing so, recycle nutrient matter.	Mod 4 Ecosystem Dynamics BIO11–11 Band 4

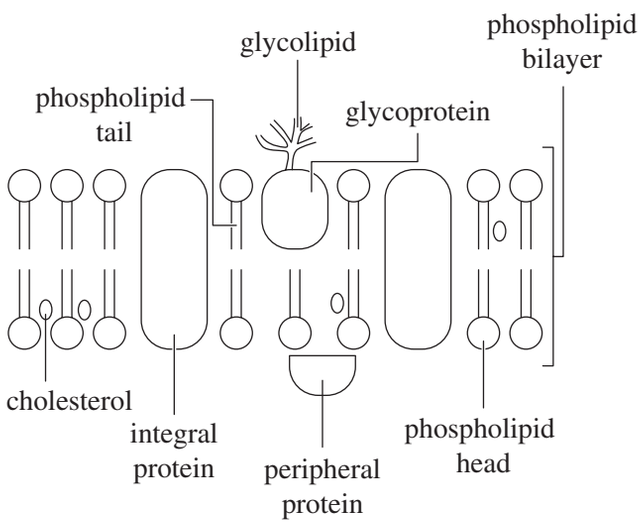
SECTION II

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 16	
(a) Using a straw, place a small piece of potassium permanganate (a purple crystal) in the bottom of a beaker containing 250 mL water. Leave the beaker to stand. After 20 minutes, small trails of purple colour will disperse throughout the beaker. If the beaker is left overnight, the colour will disperse and the water will become a uniform pink colour. This shows that the permanganate ions diffuse throughout the solution from an area of high concentration (where the solid crystal was) to an area of low concentration (the rest of the water in the beaker).  *Note: This response is more comprehensive than a student would be required to give. Responses do not need to include a diagram.*	Mod 1 Cells as the Basis of Life BIO11–6, 11–8 Bands 2–5 • Describes a model of diffusion, detailing the equipment AND method used to operate the model. AND • Shows an understanding of diffusion . . . . . 2 • Describes a model of diffusion. OR • Shows an understanding of diffusion 1
(b) (i) concentration of glucose solution (% w/w)	Mod 1 Cells as the Basis of Life BIO11–2, 11–8 Band 3 • Identifies the independent variable 1
(ii) *Any two of:* • size of the potato cube • size and shape of the beaker • volume of solution • time that the potato cube is in the solution in the beaker	Mod 1 Cells as the Basis of Life BIO11–3, 11–8 Band 3 • Identifies TWO controlled variables 1

	Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(iii)	The potato cubes in beaker 1 (0% glucose solution) and beaker 2 (5% glucose solution) gained mass (20% and 13%, respectively) over the 30-minute period. This shows that the solutions in beakers 1 and 2 were hypotonic relative to the potato, so water from the solutions entered the potato cubes and caused an increase in mass. This occurred because osmosis results in the movement of water from a low concentration of solute to a higher concentration of solute across a semipermeable membrane. The potato cubes in beaker 4 (15% glucose solution), beaker 5 (20% glucose solution) and beaker 6 (25% glucose solution) experienced a loss in mass because the concentration of those solutions was hypertonic relative to the potato. In beakers 4, 5 and 6, water left the potato, so its mass decreased (18%, 27% and 33% mass lost respectively). There was a trend in the results. When the water was hypotonic, the potato gained water and mass, but the mass lost from the potato increases as the concentration of the external solution increases. As the concentration gradient increases, the mass lost or gained increases. There was no mass lost or gained when the potato was in beaker 3 (10% glucose solution), suggesting that this concentration is isotonic (similar to that) of the potato. *Note: This response is more comprehensive than a student would be required to give.*	Mod 1 Cells as the Basis of Life BIO11–5, 11–8 Bands 3–5 • Explains the results in detail AND references the data. AND • States the trend in the results, showing an understanding of the mass loss or gain as indicated by the + or – signs. AND • Shows an understanding of osmosis . . . . . 3 • Any TWO of the above points. . . . 2 • Any ONE of the above points. OR • Provides some relevant information 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 17	
(a) **Change in pH over a 24-hour period**  	Mod 2 Organisation of Living Things BIO11–4, 11–5, 11–9 Bands 1–5 • Plots the points correctly AND draws a curve of best fit. AND • Includes an appropriate title AND labels the *x*- AND *y*-axes. AND • Chooses an appropriate scale for both axes . . . . . 3 • Any TWO of the above points. . . . 2 • Any ONE of the above points 1
(b) Reading from the graph, the pH is highest during the day (10 am to 6 pm) and lowest during the night (10 pm to 6 am).	Mod 2 Organisation of Living Things BIO11–5, 11–9 Band 3 • Describes the trend in the graph from part (a). 1
(c) During the day, photosynthesis occurs. The process of photosynthesis uses carbon dioxide (CO_2) and water and produces glucose and oxygen. As CO_2 is used by the plant, the dissolved CO_2 decreases in concentration, causing the concentration of carbonic acid to decrease and the pH to increase. During the night, there is no photosynthesis, but respiration still occurs. In respiration, CO_2 is produced. Therefore, as CO_2 builds up, the dissolved CO_2 increases, the acidity increases and the pH decreases. The pH is highest (4.45) at the end of the day (4 pm) and lowest (3.10) just before dawn (6 am).	Mod 2 Organisation of Living Things BIO11–5, 11–6, 11–7, 11–9 Bands 3–6 • Explains that CO_2 is consumed during the day in photosynthesis. AND • Explains the relationship between pH and CO_2 concentration. AND • Explains that respiration continues during the night and CO_2 is produced, so the acid increases and pH decreases until dawn. AND • Refers to the data . . . . . 4 • Any THREE of the above points. . 3 • Any TWO of the above points. . . . 2 • Any ONE of the above points. OR • Provides some relevant information 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(d) The oxygen level in the tank is lowest just before dawn because the plant has been respiring all night. Oxygen is consumed in cellular respiration according to the following word equation. oxygen + glucose → carbon dioxide + water + ATP There is no oxygen being produced because the plant does not photosynthesise in the dark. The oxygen level in the water tank decreases from 99.2% at the end of the day (8 pm) to 48.1% at dawn (6 am). *Note: Responses do not need to include the reaction.*	Mod 2 Organisation of Living Things BIO11–5, 11–6, 11–7, 11–9 Bands 4–6 • Explains that oxygen levels decrease overnight because the plant is respiring and using oxygen from the water in the process. AND • Refers to the data to show the decreased oxygen levels at dawn. . . . . 2 • Any ONE of the above points. OR • Provides some relevant information 1
Question 18	
 The substrate comes together with the enzyme. The substrate forms a complex binding with the active site of the enzyme. New products leave the active site of the enzyme. The enzyme remains unchanged. *Note: Responses may include a catabolic or anabolic reaction.*	Mod 1 Cells as the Basis of Life BIO11–7, 11–8 Bands 1–5 • Draws a clear diagram with all THREE of: – an enzyme, reactants AND products – shows that the enzyme remains unchanged throughout the reaction and a chemical change occurs (the reactants change into the products) – annotation of the enzyme facilitating the reaction from reactants to products . . . 3 • Draws a clear diagram with at least TWO of the above points. . . . . 2 • Draws a diagram with some relevant information. 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 19	
Any two of: • Plant cells have chloroplasts and animal cells do not. • Plant cells are usually larger than animal cells. • Plant cells have cell walls and animal cells do not. • Plant cells have a large vacuole and animal cells do not.	Mod 1 Cells as the Basis of Life BIO11–8 Band 3 • Identifies TWO valid differences between plant and animal cells . . . 2 • Provides ONE valid difference between plant and animal cells . . . 1
Question 20	
(a) **Cell membrane**  	Mod 1 Cells as the Basis of Life BIO11–7, 11–8 Bands 2–5 • Draws a clear diagram of the cell membrane with: – a phospholipid bilayer, studded with other molecules – at least THREE structures correctly labelled . . . . . 3 • Draws a clear diagram of the cell membrane with at least ONE of: – a phospholipid bilayer, studded with other molecules – at least TWO structures correctly labelled . . . . . 2 • Draws a clear diagram of the cell membrane 1
(b) *Any TWO of:* • provides structure and support for the cell • is semi-permeable and regulates the passage of substances into and out of a cell (exocytosis and endocytosis) • plays a part in cell signalling and communication • helps regulate cell growth	Mod 1 Cells as the Basis of Life BIO11–8 Bands 2–5 • Describes TWO functions of the cell membrane . . . . . 2 • Describes ONE function of the cell membrane 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(c) *For example:* One benefit of using models is that they can simplify an abstract concept or allow us to visualise something that is too small to see with the unaided human eye. For example, using a model of a cell membrane allows us to understand how the membrane perform its function. One limitation of using models is that they cannot incorporate the exact details of the real object or concept. For example, real chemical bonds and proteins are very different from the solid structures from which we make the models (for example, using materials found in a school laboratory). *Note: A range of responses are acceptable.*	Mod 1 Cells as the Basis of Life BIO11–8 Bands 1–5 • Outlines ONE benefit of using models. AND • Outlines ONE limitation of using models . . . . . 2 --- • Any ONE of the above points 1
Question 21	
Transport systems (vascular tissue) in plants and animals have a similar structure and function in many ways. *Any two of the following similarities:* • Vascular tissue transports nutrients, such as glucose, water and inorganic nutrients, around the plant or animal so that all cells receive the nutrients they need. • Vascular tissue transports waste materials so the animal or plant can rid itself of toxic materials. • Both plants and animals have specific tube-like tissues that carry materials around the organism. Transport systems in plants and animals also differ in terms of structure and function. Animals have a network of veins, arteries and capillaries, which contain blood. Plant vascular tissue includes xylem cells, such as tracheids, and vessel elements and phloem (sieve plates and tubes, and companion cells). In animals, blood flows in one direction from the heart to the lungs, back to the heart, and then to the body tissues. Plants do not have a closed system such as this. Flow in xylem tissue is one-way from the roots to the leaves, but flow in phloem tissue is bi-directional.	Mod 2 Organisation of Living Things BIO11–7, 11–9 Bands 1–6 • Outlines TWO similarities AND TWO differences between the transport systems of plants and animals. AND • Names the specific vascular tissue in plants AND animals . . 4–5 --- • Outlines at least ONE similarity AND ONE difference between the transport systems of plants and animals. AND • Names the specific vascular tissue in plants OR animals . . . . 2–3 --- • Provides some relevant information 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 22	
Charles Darwin observed many unique organisms on his voyages and saw that similar ecological niches in different parts of the world are occupied by very different species. In his study of finches on the Galapagos Islands, Darwin found an example to explain his Theory of Evolution by Natural Selection. Darwin proposed this theory based on key principles. 1. Variation: Inheritable variation exists within a population. Darwin observed a variety of different phenotypes of finches across different islands in the Galapagos group. One variation was related to the beaks of the finches, which ranged from long and thin, to short, thick and strong. 2. Reproduction: More organisms are produced than will survive. Darwin proposed that many organisms who compete for resources are born and not all organisms will survive. 3. Struggle for survival: Offspring compete. Darwin proposed that differently shaped beaks enabled the finches to feed on specific foods unique to the different Galapagos islands, such as cactus plants, hard seeds or nectar. Individuals competed for resources, including food. 4. Survival of the most adapted: Darwin proposed that the finches with beaks that were most able to help them feed on the resources on each island survived over birds that were not as adapted. The birds with better adapted beaks went on to reproduce, so the offspring inherited the same beak as the parent. The birds that did not survive did not reproduce. Thus, the finch population changed or evolved over time to have the favoured phenotype for the specific food resource on each individual island. *Note: Responses could also refer to other organisms Darwin studied, such as the Galapagos tortoise, the rat-kangaroo or the platypus.*	Mod 3 Biological Diversity BIO11–7, 11–10 Bands 1–6 • Relates Darwin's observations to the development of the Theory of Evolution by Natural Selection. AND • Shows a detailed understanding of the key principles of the Theory of Evolution by Natural Selection. AND • Refers to ONE organism Darwin studied from the Galapagos Islands OR Australia. . . . . 5–6 • Relates Darwin's observations to the development of the Theory of Evolution by Natural Selection. AND • Shows understanding of the key principles of the Theory of Evolution by Natural Selection. OR • Refers to ONE organism Darwin studied from the Galapagos Islands OR Australia . . . . . 3–4 • Relates Darwin's observations to the development of the Theory of Evolution by Natural Selection. OR • Shows understanding of the key principles of the Theory of Evolution by Natural Selection. OR • Refers to ONE organism Darwin studied from the Galapagos Islands OR Australia . . . . . 2 • Provides some relevant information 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 23	
(a) The ecologist could use a line or belt transect to determine the distribution of *Eucalyptus canobolensis* in the Mount Canobolas State Conservation Area. This would involve setting up a series of line transects throughout the area and plotting the location of the tree. The transects could be chosen randomly or may follow the gradient lines (for example, up the mountain). *Note: Responses could also refer to other sampling techniques, such as point sampling.*	Mod 4 Ecosystem dynamics BIO11–2, 11–3, 11–6, 11–9 Band 4 • Outlines how the distribution can be determined . . . . . 2 • Provides some relevant information 1
(b) Abundance can be estimated by using quadrats. Quadrats of 10 × 10 metres could be used for a 12 metre tree. The quadrat position is determined prior to the investigation, using a map. Random quadrats would be positioned throughout the conservation area, and the occurrence of *Eucalyptus canobolensis* in each quadrat would be noted. A more accurate estimate of the population could be determined when more quadrats are used. The population density can be estimated by calculating the average number of eucalypts in the 10 × 10 metre quadrats (trees per 100 m^2). The total population could also be estimated by knowing the total area of the Mount Canobolas State Conservation Area.	Mod 4 Ecosystem dynamics BIO11–2, 11–3, 11–6, 11–9 Bands 2–5 • Provides a detailed description of a method used to estimate abundance of *Eucalyptus canobolensis* . . . . . 3 • Provides a brief description of a method used to estimate abundance of *Eucalyptus canobolensis* . . . . . 2 • Provides some relevant information 1
Question 24	
Environmental factor | *Method/equipment used to measure factor* | *Abiotic or biotic* wind speed | anemometer | **abiotic** air temperature | **thermometer** | abiotic abundance of bilbies | traps and tags | **biotic** soil pH | **pH probe OR universal indicator paper or solution** | abiotic	Mod 4 Ecosystem Dynamics BIO 11–2, 11–3, 11–11 Bands 1–3 • Completes the table with FOUR valid responses . . . . . 2 • Completes the table with at least TWO valid responses. 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 25	
Comparisons of biochemicals such as DNA and certain proteins (for example, cytochrome *c*) provide molecular-level evidence for the Theory of Evolution by Natural Selection. DNA mutates at a regular rate. By looking at the DNA of similar organisms, it is possible to see similarities and differences and measure the rate of change between different organisms. For example, DNA hybridisation can be used to see the number of differences in the DNA between organisms and, hence, measure the relatedness of different species. To do this, geneticists heat the DNA from two organisms such as a human and a chimpanzee. The heat separates the strands of DNA and these separate strands are combined to make a hybrid piece of DNA. This hybrid DNA is then heated and the temperature at which it separates is an indication of the similarities between the individual strands. Chimpanzees and humans share 98% DNA, indicating a relatively recent split in evolutionary history. A hybrid piece of human DNA and rabbit DNA, for example, would separate earlier in the heating process, indicating an earlier split from a common ancestor. Comparing the anatomy of organisms, such as homologous structures, enables evolutionists to show that organisms have similar origins. A homologous structure that provides evidence for the Theory of Evolution by Natural Selection is the pentadactyl limb. All mammals have the same basic bone structure for their forelimbs and hindlimbs. For example, we can compare the limbs of bats, humans and whales and see the same basic structure in all three organisms. A bat has extended phalanges and webbing between the extended 'fingers' enabling it to survive in its niche. Humans have an opposable thumb, allowing us to grasp and use tools. Whales have bones that have thickened and shortened over time to become a flipper to enable the whale to swim in its ocean environment. The fact that these tetrapod animals have the same basic limb structure suggests that they all shared a common ancestor but evolved over time to function in different environments and occupy their unique niches. *Note: This response is more comprehensive than a student would be required to give. Other examples could include cytochrome c and DNA studies.* (continued on next page)	Mod 3 Biological Diversity BIO11–7, 11–10 Bands 1–6 • Describes in detail how biochemistry can provide evidence for the Theory of Evolution by Natural Selection. AND • Describes in detail how comparative anatomy can provide evidence for the Theory of Evolution by Natural Selection. AND • Refers to an example of biochemistry. AND • Refers to an example of comparative anatomy . . . . . 5–6 • Describes how biochemistry can provide evidence for the Theory of Evolution by Natural Selection. AND • Describes how comparative anatomy can provide evidence for the Theory of Evolution by Natural Selection. AND • Refers to an example of biochemistry. OR • Refers to an example of comparative anatomy 3–4

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(continued)	• Outlines how biochemistry can provide evidence for the Theory of Evolution by Natural Selection. OR • Outlines how comparative anatomy can provide evidence for the Theory of Evolution by Natural Selection. OR • Refers to an example of biochemistry. OR • Refers to an example of comparative anatomy . . . . . 2 --- • Provides some relevant information 1
Question 26	
(a) Table 1 shows a decrease in the southern brown bandicoot population after the introduction of a fox to the reserve. Foxes prey on bandicoots; thus, the introduction of the fox resulted in it killing many of the bandicoots. This can be seen in the bandicoot population plummet from approximately 100 animals to less than 20 animals in a 12-month period. After the fox was found dead, the bandicoot population began to increase. Native animals such as bandicoots fall easy prey to an introduced predator such as a fox. Table 2 shows that, after the introduction of the cane toad in 2010, the Mertens' water monitor population died off (decreasing from eight animals in 2009 to one animal three years later). This is because the cane toad is poisonous; when the Mertens' water monitors eat the cane toads, they die. Cane toads have a devastating impact on the Mertens' water monitor population as their reproductive rate is high, they eat in a wide variety and they are poisonous. Introduced species such as foxes and cane toads endanger other species in communities because introduced species have not evolved in those communities.	Mod 3 Biological Diversity Mod 4 Ecosystem Dynamics BIO11–5, 11–10, 11–11 Bands 3–5 • Explains the trend in table 1. AND • Explains the trend in table 2. AND • Describes the effects of introduced species on communities . . . . . 3 --- • Any TWO of the above points. . . . 2 --- • Any ONE of the above points. OR • Provides some relevant information 1

	Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(b)	*For example:* Humans have impacted natural ecosystems in many ways. For example, mining and agriculture have negative effects on ecosystems, causing land degradation, polluted waterways, decreased biodiversity through the development of monocultures, and habitat destruction. Practices such as stockpiling topsoil during the mining phase, mixing it with fertiliser and replacing it after the life of the mine will contribute to the restoration of the natural environment. Grasses are planted first, then smaller plants and trees are planted so that the land is regenerated. After the plants, native animals can be reintroduced to the site to restore the damaged ecosystem. This is costly but will reduce soil erosion and ensure that the land recovers and biodiversity is maintained after the life of the mine. Agricultural practices can result in a destruction of native habitat, as farmers clear land for grazing or introduce monocultures to produce crops. Practices such as leaving faunal and floral corridors on farms can contribute to the maintenance of native communities. Extensive replanting of native forests can also be restorative and, if these plantings link natural reserves with corridors, healthy native communities can survive and flourish. *Note: This response is more comprehensive than a student would be required to give. Responses may also refer to other practices, such as captive breeding programs.*	Mod 4 Ecosystem dynamics BIO 11–11 Bands 3–5 • Describes in detail TWO practices used to restore ecosystems. AND • Explains the improved outcomes for the ecosystems . . . . . 4 • Describes TWO practices used to restore ecosystems. AND • Explains the improved outcomes for the ecosystems . . . . . 3 • Describes ONE practice used to restore ecosystems. AND • Explains the improved outcomes for the ecosystems . . . . . 2 • Describes ONE practice used to restore ecosystems. OR • Provides some relevant information 1